



Bringing Science to Children: Problems and Prospects

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Look at the catalogue of children's books of any publisher, Indian or foreign and one hardly sees any popular science titles. This is so because it is only in recent times that India has become aware of the importance of bringing science to children. It has been observed that by the time an individual enters college or university, he or she is either interested in science or not interested in science. Most often, one's interest in science is not cultivated or encouraged because of the heavy science textbooks or the way science is taught at school. To rectify this error right at the initial stages, popular science books for children and teenagers are an absolute must. If

everyone retains some interest in science from childhood, whatever profession one takes up later, it would lead to the creation of a healthy, discriminating society, because today, science is not only behind every government decision or policy, it is also becoming the backbone of the humanities and even of art, and craft. The use of computers in various walks of life has made this evident. Only those who cultivate friendship with science have a good future. Efforts needed to combat the growing pollution of environment and misuse of resources also require a society interested in science and its various ramifications. If this is not done fast, ecological disasters and the

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incidents like the Bhopal gas tragedy are at our doorsteps.

Science has to be introduced in an interesting and lively manner to children so that they grow up to be adults retaining some interest in science. Books on popular science have, therefore, to be produced on a large scale. Moreover, the advantage of producing science books for children is that they can also be read and appreciated by the man in the street, whose knowledge of science is of the same level as that of a child or teenager. But then, why are there no popular science books for children? In this paper, I shall discuss both the problems and prospects of popular science books in the context of a developing country like India.

SCARCITY OF SCIENCE WRITERS

An activity flourishes provided there are individuals interested in pursuing it. And the difference between popular science writing or even popular history or economics and other types of writing is that the writer should not be just interested in writing, but he or she should also have knowledge of science and its impact on society. In other words, the writer should at least be a graduate in science, if not a post-graduate or a doctorate holder. If you meet a science graduate of an Indian university, you would find that he or she is hardly interested in English or any other language. In fact, he or she tries to neglect language as much as possible because language is taken only as a means of communication and nothing more.

The entire system of higher science education is also such that it discourages students to pay any attention to language or literature. The present objective type of examination has caused the language to deteriorate further, because essay-like answers are no longer required in examinations. How can one expect a science gra-

duate to be interested in writing? Rarely, a science student retains his or her interest in language or literature by occasionally reading a literary classic. It is, therefore, extremely difficult to come across a science student who is interested in science writing, let alone in cultivating writing skills. A good sign in recent years is that efforts are being made to make science students realize that science writing is also a good, paying career. A number of science writing courses offered at the Delhi University and the Jamia Millia University are attracting a large number of science students. In the years to come, there are likely to be more science writers and editors.

However, I would not dare say that only science students can become good science writers, especially for children. A person having the knack of writing can easily shift to writing science for children, provided he or she is ready to take pains to learn and understand science. And if he or she does not feel confident enough, the assistance of a science student can be taken. In fact, he or she can consult the scientists working in that particular field, take their guidance, discuss details with them, and even allow them to go through their written texts to detect any errors that might creep in.

Sometimes, even a science writer has to seek the guidance of scientists in a particular field, because nobody can be a master of all fields of science. I myself took the assistance of several scientists who had been to Antarctica when I wrote my book *A Passage to Antarctica* because, though information on Antarctica was available in plenty, the feeling of having been to that continent which I wanted to impart to readers, was lacking, because I have not been to the continent. I wrote the book after making extensive notes on the experiences of scientists, their slide-shows and photographs.

THE WRITING TECHNIQUE

In so far as the writing technique is concerned, there is no substitute for reading. One should not simply read a good popular science book but also study how it has been written. One should, for instance, study how a particular science subject has been introduced, how history is sometimes mixed with science to make the latter interesting, how anecdotes of scientists and famous words of scientists are employed to add life and colour to the subject under discussion, and so on. One should particularly read popular science books written by famous science writers like Arthur C. Clarke, Nigel Calder, David Attenborough, Isaac Asimov etc. In fact, one should read their best works.

Obviously, when writing for children, one has to imagine what one would have liked to read as a child, what would have been of interest to him or her, what things should be given in detail and what should not and so on. The scientific or technical terms should not be used without an explanation, because a child can hardly be expected to refer to a science dictionary. The concepts behind the terms should first be explained and then the terms be mentioned so that the child becomes conversant with them. In fact, it is always better to write any scientific concept very simply in terms of everyday communication. For instance, when I had to write about "Spectrum," the seven coloured band produced when sunlight falls upon a glass prism, in the case of the biography of Meghnad Saha whose work concerns the spectrum of the sun and stars, I started from the beautiful colours of the rainbow seen after a shower of rain. In a biography of a scientist, or for that matter, any great man, a child is more impressed by his actions than by his words or techniques. It would not be enough to tell a child that such and such a scientists worked under trying condi-

tions. One has to give a description of those trying conditions and how he overcame them.

Illustrations and photographs are a must to support an idea or concept in a popular science book. Hence, the necessary attention should be paid to this aspect while writing the book. Whenever one comes across a good photograph or illustration, a xerox copy should immediately be made so that it could be referred to while making illustrations for the book. Photographs and colour transparencies are also available sometimes free of cost. But one has to search for them and get in touch with the agencies that offer them. Sometimes, however, no illustration or photograph is available to support what one has in mind. In such circumstances, one has to sketch out the idea on paper, which can be further improved upon by artists and illustrators.

STORY-LIKE PRESENTATION

If any popular science book could be written in a story-like manner, making both the concepts and the concerned scientists come alive, there is nothing to beat such a book. It would be an ideal presentation of science. Here I would like to give the example of a book on planets that I wrote in a story-like manner. Information on planets, their histories, characteristics and how they were discovered—is available a plenty. In fact, it becomes dull and boring on occasions to read one book after another giving the various facts and figures about the various planets. So, I decided to make the planets tell their own stories. I also attributed to them different human characteristics, often assigned to them in astrology. For instance, I portrayed Mars as an aggressive individual; Moon, a funny character; Venus, a soft-spoken lady; Jupiter, an egocentric person; and Earth, a motherly and kind person etc. But then,

the question arose as to how I should weave their stories in the form of a single story narrative. I therefore thought of a dream sequence in which these planets appear one after another to a boy as he travels in space from the Earth to Pluto and back. The Earth appears at the end when the boy is suddenly transferred back home and wakes up crying that the Earth is dying!

This book which is called *Meet the Planets*, with cartoons by Ajit Ninan Mathew, is in the process of publication. Of course, this type of presentation of science borders on science fiction where story and human characters are more important. In short, I would add that there are no ready-made formulae for science writing or, for that matter, any kind of writing. One has to think hard, consider every aspect of science before finalising a story plot for a popular science book. Every care has to be taken to see that there is no absurdity anywhere and everything fits in properly. One has simply to use his or her imagination to enliven a subject which is already interesting and absorbing.

PUBLISHER'S ROLE

Why is no publisher interested in bringing out popular science titles? An average Indian publisher is basically interested in the commercial aspects of a book, because he has to survive in the competitive market. He is, therefore, more interested in publishing a science text-book rather than a popular science book, because he knows that the former can be recommended as a standard book in various schools and so can become a commercial success. He is doubtful about the success of a popular science book which can only be recommended as supplementary reading material which a child may or may not buy. But in recent years, there has been an improvement in the situation, thanks to Operation

Blackboard and other science programmes. Both the Central Government and the States are allocating special funds to buy popular science books in bulk for distribution to school libraries. The aim is to cultivate the interest of children in science. After the necessary approval, a State Government can buy as many as 2,000 copies of a particular science title. The States of U.P., Orissa and Kerala bought copies of my 4,000 Science Quiz in bulk, about 2,000 each. In other words, a publisher can easily procure an order of about 10,000 copies of well brought out popular science title. Moreover, a publisher forgets that popular science titles sell over the years, because generation after generation of children buy and read such books.

But publishing a popular science book is not as easy an affair as is publishing any other kind of book. Comparatively speaking, it needs considerable effort on the part of the publisher to produce a really good popular science book. First of all, a publisher does not know where to look for a popular science writer. Often, he goes after the Director of a laboratory or institute, who may or may not be a good communicator of science.

Even if a good science manuscript comes to the desk of a publisher, he cannot assess it. The inflow of popular science books is also not continuous enough to warrant the services of a full time science editor. The science editor who handles science text-books is not necessarily the right person though he can certainly fill the bill to some extent. The publisher should, therefore, opt for a consultant science editor who can evaluate a MSS whenever it comes, besides helping him select the right authors for future books. An imaginative science editor can not only make editorial changes and ensure that there are no factual errors pertaining to the subject, but

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he can also suggest imaginative changes in the presentation of the subject matter and suggest new illustrations and photographs to support the text. However, apart from correcting the science part of a text, any imaginative editor with some interest in science can perform the aforementioned tasks equally well. In fact, he may even prove better because he would view the text from a lay person's point of view.

POTENTIAL TOPICS

Any scientific topic, howsoever complicated or dull or hard it may look, could be written in a popular manner. At present, books on science projects, models and charts are much in demand because today these activities have become part of the school curriculum. Further, books on how things work, natural phenomena, day-to-day science jargon etc, are the need of the hour. Subjects such as archaeology, space, astronomy, dinosaurs, robots etc, are perennially in demand. There is also con-

siderable need to publish books on the history of science in India, the present science scenario, Indian scientists and inventors. In fact, there is at present almost a vacuum in the entire field of popular science writing for children. In order to encourage people to write science for children, the Department of Science & Technology has also introduced an award of Rs. 50,000, which is given annually on the Science Day. There are also a large number of awards for writing popular science books in Hindi. The Departments of Space, Environment, Science & Technology and Atomic Energy, have instituted these awards for writing popular books on their respective science fields. The prize money for these awards ranges from Rs. 3,000 to 10,000 and generally three prizes are given. The Central Hindi Directorate also entertains books on science in Hindi which, on meeting with its approval, are purchased in bulk, so that publishers are eager to publish them. In short, the boom in popular science writing is at hand.